

COGSWELL (W²)


FIELD ASEPSIS. ***IN THE MILITIA**

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GENTLEMEN :

With your permission, I shall discuss Field Asepsis rather than Field Antiseptics.

If the surgery of the Militia is to keep abreast of modern surgery, it is necessary that we should be equipped for aseptic work. This can be done with a slight addition to our present supplies.

Again, if we are to advance beyond the surgery of the late war, we must be prepared to do on the field aseptic operations of the head, chest and abdomen.

A hospital tent can be made a better place for an aseptic operation than any operating room in a hospital.

The few minutes allotted to this paper will only permit the briefest suggestions on the following subjects, and out of the many different forms of preparation, I have selected those which seem to give the best results for aseptic work up to the present time.

Let us first recall the most important germicidal and antiseptic agents.

1. Fire. Complete destruction by burning.
2. Steam under pressure. 105° C. (221° F.) for ten minutes.
3. Boiling in water for half an hour.
4. Chloride of lime. 4% solution.

5. Mercuric Chloride. A solution of 1-500 ten minutes.
These agents will destroy all spore-infected material. For
the destruction of Micro-organisms not containing spores:

1. Fire.
2. Boiling in water for 10 minutes.
3. Dry heat. 110° C. (230° F.) for two hours.
4. Chloride of lime. 2% solution.
5. Chlorinated soda. 10% solution.
6. Mercuric Chloride. Solution of 1.2000.
7. Carbolic acid. 5% solution.
8. Sulphate of copper. 5% solution.
9. Chloride of zinc. 10% solution.
10. Sulphur Dioxide. Exposure of 12 hours to the atmosphere containing at least 4 volumes per cent of this gas in presence of moisture.

Extract from the American Public Health Association in '84.

The following table gives the germicidal and antiseptic strength of the common solutions used in surgery. Time of submersion 10 minutes. The antiseptic strengths can be readily borne on the skin and granulating surfaces of the exterior of the body.

GERMICIDE.	ANTISEPTIC.
Boiling water with soda,	Best.
Mercuric Chloride,	1-500
Carbolic acid,	1-20
Silver nitrate,	1-100
Sulfo-Naphthol or Creolin,	1-20
Formaldehyde, (gas,)	1-40
Copperas, (ferrous sulphate,)	Sol. 1-2000 " 1-1000 1-3 unreliable. 1-200

	GERMICIDE.	ANTISEPTIC.
Chloride of lime,	1-25	1-500 to 1-100
Potassium Permanganate, 1-10 ?		1-100
Chlorinated Soda,	Unsatisfactory.	1-20 " 1-6
Sulphate of Copper,	"	1-200 " 1-100
Hydrogen Peroxide,	"	1-33½
Sodium Carbonate,	"	1-20
Alcohol, 95 %,	"	Slight, if any.
Ether,	"	" "

Preparation of the Field of Operation.

If time and condition of patient permits, he should be placed in a hot water tub bath. The skin within an area of a foot from the limits of the wound or contemplated incision should be thoroughly washed with soap and water. If the skin is covered with greasy substances, sweet oil rubbed on, will help to remove the dirt and grime. The surface should then be shaved, not only for the purpose of removing the hairs, but also for the more important reason, the removal of the desquamated epithelium, which contains most of the micro-organisms in the skin. The surface should again be scrubbed with soap and water, then with ether or alcohol to remove fatty substances, then with hydrogen peroxide, then washed in 1-1000, or even 1-500 corrosive sublimate for two minutes, and finally a corrosive poultice bandaged over the field and left until time for operation.

At the time of operation, the patient to be entirely covered with a sterilized sheet, an opening made in it through which to operate.

Preparation of the Hand of Operator and Assistants.

The preparation of the hands of the operator and assistants is more difficult than that of the patient. For the latter, only one preparation is necessary and the more painful part, such as scrubbing, can be done under ether; whereas in the former, constant use of strong antiseptics renders the skin of the hands extremely sensitive, often making multiple cracks and fissures where dirt collects and is rendered more difficult for removal next time. The following method is suggested:

The finger nails should be cut short and thoroughly cleansed. The hands and arms up to the elbows washed with soap and water for at least 10 minutes. The finger nails again cleansed. Then, with a fresh supply of soap and water, the hands scrubbed with a nail brush, which has been previously kept in 1-500 corrosive sublimate solution, rinsed in ether, followed by hydrogen peroxide. Then the hands and arms should be placed into a 1-500 HGCL₂ solution for one minute. Then held in a hot 1-2000 HGCL₂ solution for 5 minutes. After that, washed off in water that has been boiled.

The treatment of the hands and arms with permanganate, oxalic acid, and peroxide does not seem to bring any better results. There may be this advantage that in this method the arms and hands are washed in a larger number of solutions and thereby cleansed more thoroughly, but at the same time, the final washing in corrosive is apt to be shorter than in the first method. Neither is entirely satisfactory, as the hands and arms often become so cracked, swollen and sensitive that delicate manipulation is impossible and thorough preparation extremely painful. It, therefore, seems best, after a thorough cleansing of the nails and hands with soap and

water, ether and a solution of 1-2000 HGCL₂, to put on thin rubber gloves that have been thoroughly cleansed with soap, water, and kept in 1-2000 HGCL₂ solution. Operator and assistants dressed in sterilized robes.

Preparation of Instruments.

All instruments that have been used should first be washed in cold water to remove the blood, then scrubbed with soap and hot water, and before using, boiled in a 1% aqueous solution of cooking soda, 15 minutes. This is an antiseptic solution and retards rusting. This is the best method for all instruments except knives and others requiring a sharp edge. To sterilize a knife and retain its edge, subject it to the gas of formaldehyde for 15 minutes in an enclosed receptacle.

Preparation of Dressings.

All dressings should be subjected to a temperature of 110° C., dry heat, for half an hour. But the penetrating force of dry heat is uncertain ; therefore, it seems best that all dressings should be boiled in water for 10 minutes and then dried.

Let me say here, that as boiling is a germicidal agent for all pyogenic organisms, every surgical instrument, dressing and appliance that can be, should be boiled ; and if the hand of the operator and skin of the patient could be boiled, we would have perfect asepsis.

The Preparation of Sutures and Ligatures.

Non-absorbable sutures and ligatures in general use : silk, silk worm gut, cotton thread, horse hair and silver wire. All these can be and should be made sterile by boiling with soda ; preferably, just before using. If not, after being boiled, they

can be placed in a receptacle containing a 1-2000 HGCL₂ solution.

Absorbable sutures: cat gut, kangaroo and other animal tendons.

The best method of preparation is Bergmann's method, which follows:

First, the vessel to serve as a receptacle is sterilized in steam for three-quarters of an hour, then raw cat gut is wound upon suitable glass bobbins and is placed in ether for 24 hours to free it from fat. Then the ether is poured off and replaced by a solution of corrosive sublimate 10 parts, absolute alcohol 8 parts, and distilled water 200 parts. This alcoholic solution becomes turbid, and after a day, should be renewed twice. After 72 hours the sublimate solution is replaced by absolute alcohol, in which the cat gut is kept permanently.

Dow's method is somewhat similar, except that he boils the cat gut in alcohol, which tends to harden as well as sterilize it. I do not know at present any entirely satisfactory method for sterilizing cat gut.

Antiseptic Powders.

Antiseptic Powders are seldom necessary in aseptic operations. Those in general use are iodoform, subnitrate of bismuth, oxide of zinc, iodol, dermatol, aristol, salol. Clinically, iodoform holds the first place among the antiseptic powders, and, although we are told by the bacteriologists that bacteria grow and flourish on iodoform, yet we also know that "Iodoform in contact with the tissues of the body develops antiseptic properties indirectly by contact with the product of microbial decomposition (ptomaines and toxalbumin). Their chemical action liberates a certain proportion of free iodine which in-

hibites a further development of microbes." Iodoform is especially efficacious about the ear, bladder and rectum. Its offensive odor can be masked by adding burnt coffee powder or a few drops of sandalwood or any aromatic oil.

To secure perfect asepsis in our Militia, we must separate the septic from the non-septic cases. To accomplish this, three tents seem necessary. One for aseptic operations and the other two for the care of septic and non-septic cases. There should be one surgeon with trained assistants to take care of the aseptic and another surgeon with assistants to take care of the septic cases. Each Company Bearer should be provided with a pocket pouch containing, among other supplies, a concentrated solution of corrosive sublimate, antiseptic dressings and bandages. The Company Bearers should be instructed, the instant a man is wounded, to cut the clothing over the injured part, and if the skin has been punctured and there is any bleeding, all clothing and dirt near the wound to be removed, the gauze moistened with the corrosive solution, placed over the wound and firmly bandaged. The patient to be sent to the Field Hospital as soon as possible. If in battle, when the fire of the enemy will permit.

Experience having shown that a large proportion of accidental wounds are aseptic, and if managed properly, will heal without complications; therefore, all forms of first aid given to the wounded must be of such a character as not to compromise the possibly aseptic character of the injury.

Explorations by finger or probe are absolutely reprehensible and useless until the field of injury has been made aseptic, which cannot be done until the patient is brought to the Field Hospital. At the Hospital, the clothes should be entirely removed from the injured part and the skin within at

least a foot of the injury, thoroughly washed with soap and water, before the temporary bandage is removed. Then the bandage should be removed, and starting from the point of injury, thoroughly prepared according to previous directions for the preparation of the skin.

To carry out modern asepsis, each organization should be provided with a sterilizer, there should be a Hospital corps attached to each Regiment, there should be additional tents, and there should be an increase in the number of surgeons to each organization.

Finally, if the condition of the patient demanded it, I should not hesitate to operate if I were deprived of everything except a razor, green soap, boiled water and a corrosive tablet.

